# THE DIAGNOSTIC VALUE OF LIPOID IN THE VARIOUS STRUCTURAL TYPES OF LEPROSY

## OBSERVATION OF 1053 CASES [1]

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Virchow's description of leprocytes led to the belief that their vacuoles are due to intracellular edema. Later, however, it was found that the vacuoles are only negative signs observed in sections after treatment with fat solvents, and that appropriately stained frozen sections show fat inside the histiocytes.

Mitsuda (1) emphasized this fact many years ago, and we understand that he still depends to a great extent on frozen sections stained for fats in the study of leprosy lesions. This feature of the Virchow lepra cell has been pointed out by various other writers in the past.

More recently, in 1942, Rath de Souza and Alayon (3) emphasized the diagnostic value of the study of the lipoids in the different structural types of leprosy. They reported that 83.6 per cent of their lepromatous cases were positive for lipoid, while all of their tuberculoid cases were negative, whereas 16.7 per cent of their reactional tuberculoid cases and 33 per cent of those considered to be indeterminate were lipoid-positive. Regarding the indeterminate cases positive for lipoid, these authors held that they should rather be classified lepromatous infiltration, either regressive or residual. In reality, upon checking the results reported by these authors we find that 65 of their indeterminate cases were lipoid-negative. Portugal (2), in 1946, claimed to have found 6 out of 9 lepromatous cases to be positive for lipoid.

The histiochemical study of leprosy is still in its incipient phase, but it offers great possibilities. We, therefore, decided

[1] Work from the Laboratory of the Epidemiological Section (Dr. João Baptista Risi) of the National Leprosy Service (Dr. Ernani Agrícola). A modified translation of a paper presented at the III Panamerican Conference on Leprosy, Buenos Aires, December 1951.

to investigate the matter of the presence of lipoid within the cells of the infiltration in the different forms of the disease. From the point of view of histopathology the presence of lipoid in the cells represents a valuable element in the diagnosis of the various types. Those who are used to dealing with skin sections of leprosy patients realize the difficulties that sometimes occur in reaching a correct diagnosis of the structural type of the disease. The results of this study show the value in that connection of the examination for lipoids.

## MATERIAL AND METHOD

The examination for lipoid was performed in 1,053 skin specimens of leprosy patients.

The technique employed was as follows: (1) The specimens were fixed in formolsaline solution. (2) Frozen sections were made, 10 microns thick. (3) Sections were stained with Sudan III or Scharlach R.

## RESULTS

The frequencies with which lipoids were found is shown in Table 1.

TABLE 1.—*Results of the examinations for lipoids in 1,053 specimens from cases of various types of leprosy.*

| Classification of cases | Lipoid positive | | Lipoid-negative | | Total |
|---|---|---|---|---|---|
| | Number of cases | Per cent | Number of cases | Per cent | |
| Lepromatous, nonregressive[1] | 355 | 95 | 18 | 5 | 373 |
| Lepromatous, regressive[2] | 116 | 100 | ---- | ---- | 116 |
| Indeterminate | ---- | ---- | 471 | 100 | 471 |
| Tuberculoid, quiescent | ---- | ---- | 75 | 100 | 75 |
| Tuberculoid, reactional (typical and borderline) | ---- | ---- | 18 | 100 | 18 |
| Totals | 471 | | 582 | | 1,053 |

[1]—Virchow's cells and bacilli.

[2]—Virchow's cells but with no bacilli.

In lepromatous leprosy not all cases showed the presence of a lipoid substance within the cytoplasm of the cells. It is generally accepted that the presence of Virchow's cells—histiocyte bearing fine drops of lipoid within their cytoplasm—is the characteristic feature of the lepromatous structure. We found

that in 19 instances (5%) out of 373 cases which were actual lepromatous the lesions did not present classical Virchow's cells, although the cases must be classified as lepromatous because of their clinical, immunological and bacteriological conditions. With regard to the lipoid-positive lepromatous cases, the lesions consist of massive and extensive infiltrations of histiocytes, distinctly separated from the epidermis by Unna's collagenous band, which latter feature we consider of great value in the histopathological diagnosis of the lepromatous type. In the lipoid-negative cases, instead of this massive infiltration we find small foci or large infiltrations of histiocytes in a transitory state tending to diffuse infiltration. Observing these cases we found that they were either new lepromatous ones, or post-indeterminate ones recently transformed into lepromatous. With progression of the disease in such cases there will appear the first Virchow's cells, histiocytes bearing droplets of lipoid within their vacuoles.

(2) Of the 116 treated, regressive cases of lepromatous leprosy, all still showed the presence of Virchow's cells in spite of bacteriological negativity. These lesions we call *regressive lepromatous infiltrations*, in which we may observe both small or large foci of cellular infiltration and the presence of Virchow's cells without *M. leprae*.[2] We apply this term to an infiltration with one or more Virchow's cells which are negative for bacilli after a thorough examination of several slides stained by the Gram-Weigert and Ziehl-Klingmüller techniques. The examination for lipoids is especially important in such treated cases in which the infiltration is reduced to small histiocytic foci. Sections stained with hematoxylin and eosin would lead the histopathologist to the diagnosis of the indeterminate type, but frozen sections stained with Sudan III would show the presence of some Virchow's cells. In that case the diagnosis of regressive lepromatous infiltration is suggested, and not simple inflammatory infiltration.

(3) The examination for lipoid was negative in all of the indeterminate cases, and in all of the tuberculoid ones, whether quiescent or reactional (typical and borderline). Reactional tuberculoid cases which, with the development of the disease, become lipoid-positive must be classified as lepromatous.

A case which illustrates this point may be cited. On July 10, 1951, a

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[2] The meaning of "regressive" in this paper is quite different from that of Rath and Alayon ([3]).

biopsy was performed of an infiltrated spot in the lumbar region. The histological picture suggested a borderline case, negative for lipoid but with large numbers of Hansen's bacilli, both in globi and free. Later, on August 22, 1951, two other biopsies were performed, one of the same lesion and one of an erythematous infiltration of the leg. The former revealed about the same structure as before, the only difference being that there were found fine droplets of lipoid within the cytoplasm of a few histiocytes. The latter specimen showed the typical lepromatous structure, diffuse infiltration of lipoid-bearing histiocytes. The findings of this case enable us to say that the patient had passed the borderline stage in August although one of the specimens showed the same borderline histological structure as before. It also showed the presence of lipoid, which was sufficient to classify the case as a lepromatous, and this was confirmed by the other biopsy.

## SUMMARY AND CONCLUSIONS

1. The examination of histological specimens for lipoid was positive only in lepromatous cases, nonregressive and regressive. Of the former, 5 per cent were negative, but all of the latter were positive.

2. Virchow's cells may be present in the lesions of treated lepromatous cases in spite of bacteriological negativity. These lesions we call regressive lepromatous infiltrations. They may show either a typical lepromatous structure but without bacilli, or apparently only simple inflammatory infiltration in which, however, frozen sections will show a few Virchow's cells.

3. The examination for lipoid was negative in all simple inflammatory lesions, and in all of tuberculoid structure whether they were quiescent, reactional or borderline.

4. From the moment a reactional tuberculoid case becomes positive for lipoid, we may classify it as a lepromatous one.

5. The presence of lipoid in untreated cases of leprosy signifies a bad prognosis.

6. In lepromatous cases treated by sulfone drugs, the Hansen's bacilli disappear from the infiltrations before the Virchow's cells.

## RESÚMEN

El autor examinó 1,053 muestras de piel de pacientes leprosos utilizando la tinción por el Sudan III o el Scharlach R en cortes microtómicos por congelación. Se demostró la presencia de lipoides solamente en lesiones típicas de casos lepromatosos, tanto regresivos como no-regresivos, aunque el 5% de éstos ultimos fueron negativos. Todas las reacciones celulares inflamatorias simples y las lesiones leprosas del tipo tuberculoide fueron

negativas. El autor usa el criterio de la presencia de lipoides en las lesiones (células de Virchow) de la lepra, como indicativo de reacción lepromatosa. En casos tratados con dragas sulfonas, los bacilos desaparecen antes que los lipoides de las células de Virchow.

## REFERENCES

1. MITSUDA, K. The significance of the vacuole in the Virchow lepra cells, and the distribution of lepra cells in certain organs. Tokyo Iji-Shinshi (1918) Nos. 2066 and 2067 (in Japanese); *reprinted, in translation, in* Internat. J. Leprosy **4** (1936) 491-508.
2. PORTUGAL, H. Contribution to the study of the classification of leprosy. Aspect of lesions, antigenic response, and presence of microorganism in histological structure. Internat. J. Leprosy **15** (1947) 162-168.
3. RATH DE SOUZA, P. and ALAYON, F. Sôbre a presença de lipídios nas lesões cutaneas da lepra. Rev. brasileira Leprol. **10** (1942) 369-401.